Trend Study 15-1-99

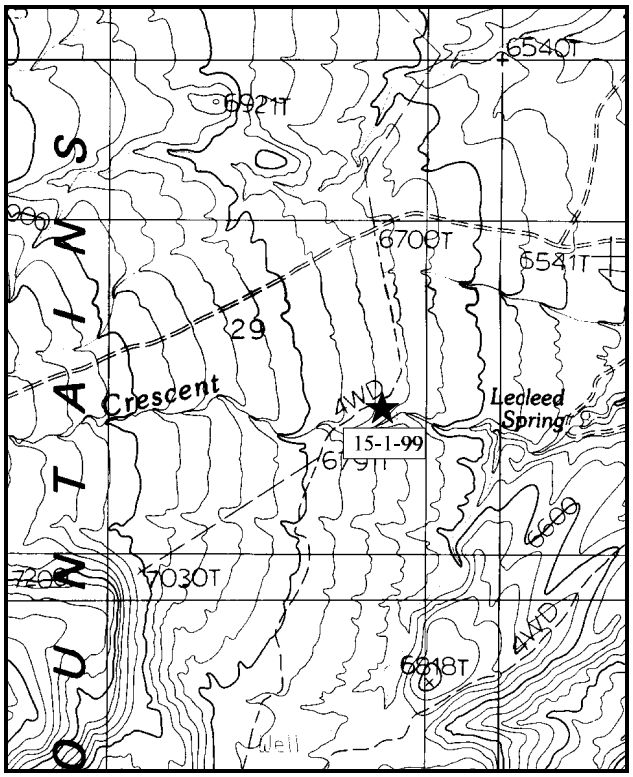
Study site name: Eagle Bench . Range type: Chained, Seeded P-J .

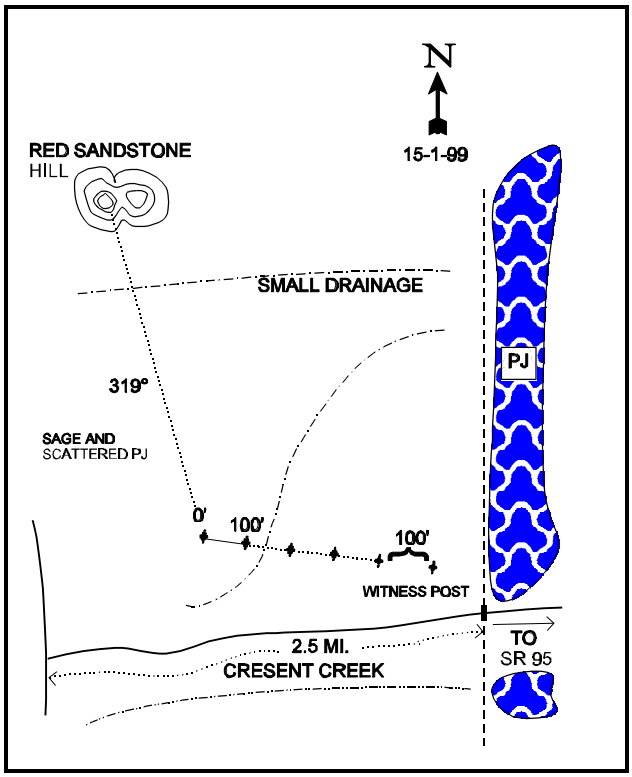
Compass bearing: frequency baseline 95°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

This transect is located in the Crescent Creek chaining on the east side of the Henry Mountains. It can be reached from SR 95 (approximately 11 miles through Little Egypt then west up Crescent Creek) or from the west via Copper Ridge of Granite Ridges and down Crescent Creek. From the intersection in the north part of Section 36 (T 31S, R 10E), go 0.6 miles down Crescent Creek to a cattleguard. Continue 1.95 miles to another cattleguard on the east edge of a large chaining (near section marker T 31S, R 11E, Sec. 29). On the north side of the road (NW of the cattleguard) there is a witness post out in the chaining. The transect starts with the 0-foot end of the baseline stake 500 feet to the west-northwest (275°M) at a short fence post tagged #7138.





Map Name: Mount Ellen Diagrammatic Sketch

Township 31S , Range l1E , Section 29 UTM 4215029.129 N, 524673.846 E

DISCUSSION

Trend Study 15-1 (38-1)

The Eagle Bench study site is located in a pinyon-juniper woodland type that was chained and seeded in 1968. The site is located at an elevation of 6,640 feet that gently slopes to the northeast. Precipitation data from Hanksville shows that about 50% of the moisture for this area comes in the form of summer thundershowers during the months of July through October. Mean annual precipitation at the study is at least 12 inches. Wyoming big sagebrush is the dominant key browse species for deer in the area. Scattered pinyon and juniper are slowly becoming reestablished in the chaining, most averaging five to six feet in height. In 1999, point-center quarter data show 64 juniper trees/acre and 67 pinyon trees/acre, both with an average stem diameter of 3 inches. Approximately 33% of the junipers sampled are large trees which were knocked over during the chaining, but are still living. The site is located in the Crescent Creek Allotment which is managed by the BLM. Water for livestock and wildlife is available in Crescent Creek which is almost one mile south of the study site. Pellet group data from 1999 indicate light use with <1 deer and 9 cow days use/acre (2 ddu/ha and 22 cdu/ha).

The soil is a loam with a neutral pH (6.6). Parent material appears to be mostly granite with some sandstone. There is a considerable amount of rock on the soil surface and throughout the soil profile. The soil is reddish-brown in color and fairly shallow with an estimated effective rooting depth of just over 9 inches. Organic matter is low and appears to be limited to the area directly beneath sagebrush plants. The erosion potential is only moderate even with the sandy soils and moderate slopes of the area. Some pedestaling around the base of blue grama and sagebrush indicates that a certain level of erosion is occurring, but does not appear to be excessive. A nearby drainage has abundant litter and sagebrush in the bottom to prevent appreciable erosive cutting.

Wyoming big sagebrush is the most abundant shrub species in the area with an estimated density of 6,866 plants/acre in 1987, and 6,400 by 1994. Currently, the sagebrush population is estimated to be 6,340 plants/acre. The majority of the sagebrush consist of mature plants (79% in 1987, 90% in 1994, and 84% in 1999). Biotic potential (proportion of seedlings to the population) remains low at only 3%, with recruitment from young plants comprising only 8% of the population. Percent decadency, although low, has slightly increased from 3% to 9% since 1994. The sagebrush population currently shows poor leader growth, but abundant seed production. Most plants have good vigor and show light to moderate hedging. Broom snakeweed is the only other numerous shrub found on the site. The population has remained at similar levels from 1987 to 1999, with 2,466 plants/acre in 1987, 1,960 plants/acre in 1994, and 2,080 plants/acre by 1999. However, the biotic potential substantially increased in 1999 with nearly a five-fold increase in the number of seedlings, coupled with a four-fold increase in the number of young plants. This may indicate an expanding population in the future. Species having low densities that were sampled in 1999 include green ephedra, Utah serviceberry, and slenderbush eriogonum.

The warm season increaser Blue grama is the dominant understory grass, followed by bottlebrush squirreltail, crested wheatgrass, and Indian ricegrass. The summer precipitation pattern and grazing program favors blue grama, the only warm season grass growing on the site. Between 1987 and 1994, nested frequencies of all perennial grasses declined significantly with the exception of Indian ricegrass which increased. In 1999, nested frequencies for all perennial grasses remained at similar levels to the 1994 reading, except for squirreltail which significantly increased. The annual cheatgrass is present at the site, but is low in frequency at the present time. Forbs have been nearly nonexistent during all readings with about a dozen species sampled in both 1994 and 1999. All species combined produce less than 2% cover. Total herbaceous cover remains low with an average of 6.1% and 5.3% in 1994 and 1999 respectively.

1987 APPARENT TREND ASSESSMENT

In 1987, ground cover appeared fairly good at 81%, but a good portion of this was either rock or pavement (39%). The sagebrush canopy cover, which was not estimated in 1987, appears to be about 16%. Grass and forb composition is poor, together they only make up 20% of the vegetative cover.

1994 TREND ASSESSMENT

Protective ground cover has declined slightly since 1987. Bare ground has increased slightly while litter has declined by 40%. Total vegetative cover was estimated at 24%, but only 5% of this cover was composed of herbaceous plants which are much better at holding soil in place. Trend for soil is stable to slightly down and in poor condition. The browse trend appears stable due to a healthy, stable population of Wyoming big sagebrush. Recruitment however, is poor. The herbaceous understory is lacking on this site. Combined, grasses and forbs make up only 20% total ground cover. Nested frequencies of grasses declined while those of forbs increased, but this forb increase cannot compensate for the losses for the grasses for the forbs only make up 20% of the herbaceous cover. Some of the increase for forbs may be due to the larger sample size taken in 1994. Overall, nested frequencies of grasses and forbs declined, indicating a slightly downward trend.

TREND ASSESSMENT
soil - stable to slightly down
browse - stable
herbaceous understory - slightly down and in poor condition

1999 TREND ASSESSMENT

Trend for soil appears stable with similar ground cover characteristics compared to 1994. Erosion appears minimal even with low herbaceous cover. Trend for browse appears stable for the key species Wyoming big sagebrush. Use is light to moderate, percent decadency low at 9%, vigor is good, and recruitment appears adequate to maintain the population. Herbaceous understory trend is slightly up. Sum of nested frequency for perennial grasses and forbs increased, and annual species are insignificant in the community.

TREND ASSESSMENT
soil - stable
browse - stable
herbaceous understory - slightly up

HERBACEOUS TRENDS --
Herd unit 15 , Study no: 1

Type	Species	Nested Frequency '87	'94	'99	Quadrat Frequency '87	'94	'99	Average Cover % '94	'99
G	Agropyron cristatum	39	34	31	22	11	13	2.40	.68
G	Bouteloua gracilis	$_{b}$196	$_{a}$122	$_{a}$113	73	44	43	1.53	1.87
G	Bromus tectorum (a)	-	$_{a}$3	$_{b}$15	-	1	6	.00	.05
G	Hilaria jamesii	-	5	-	-	2	-	.01	-
G	Oryzopsis hymenoides	19	27	24	7	13	12	.11	.31
G	Sitanion hystrix	$_{b}$109	$_{a}$36	$_{b}$84	52	15	41	.34	1.34
G	Stipa lettermani	-	3	-	-	1	-	.00	-
Total for Annual Grasses		0	3	15	0	1	6	0.00	0.05
Total for Perennial Grasses		363	227	252	154	86	109	4.40	4.21
Total for Grasses		363	230	267	154	87	115	4.41	4.26
F	Arabis spp.	$_{a}$-	$_{a}$1	$_{b}$9	-	1	5	.00	.05
F	Aster spp.	$_{a}$-	$_{b}$26	$_{a}$-	-	10	-	.05	-
F	Astragalus spp.	$_{a}$-	$_{a}$-	$_{b}$14	-	-	5	-	.05
F	Calochortus nuttallii	-	5	-	-	2	-	.01	-
F	Chaenactis douglasii	-	3	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	-	6	-	-	3	-	.01
F	Erigeron spp.	-	6	-	-	2	-	.01	-
F	Eriogonum spp.	-	-	1	-	-	1	-	.00
F	Gilia spp. (a)	-	22	16	-	11	8	.05	.04
F	Hymenoxys acaulis	2	-	-	2	-	-	-	-
F	Lesquerella kingii	$_{a}$-	$_{b}$8	$_{c}$41	-	3	19	.01	.22
F	Phlox austromontana	-	-	3	-	-	2	-	.18
F	Phlox longifolia	$_{a}$6	$_{b}$56	59	3	27	26	1.33	.18
F	Polygonum douglasii (a)	-	4	10	-	1	3	.00	.01
F	Ranunculus testiculatus (a)	-	-	1	-	-	1	-	.00
F	Senecio multilobatus	$_{a}$16	$_{a}$7	$_{b}$31	7	4	17	.02	.24
F	Townsendia incana	$_{a}$-	$_{b}$6	$_{b}$13	-	3	6	.16	.03
F	Unknown forb-perennial	6	-	-	2	-	-	-	-
Total for Annual Forbs		0	26	33	0	12	15	0.05	0.07
Total for Perennial Forbs		30	118	171	14	53	81	1.61	0.95
Total for Forbs		30	144	204	14	65	96	1.67	1.03

Values with different subscript letters are significantly different at % = 0.10

BROWSE TRENDS --
Herd unit 15 , Study no: 1

Type	Species	Strip Frequency '94	Strip Frequency '99	Average Cover % '94	Average Cover % '99
B	Amelanchier utahensis	0	1	-	-
B	Artemisia tridentata wyomingensis	89	88	16.02	21.45
B	Ephedra viridis	0	1	-	-
B	Eriogonum microthecum	10	7	.06	.04
B	Gutierrezia sarothrae	41	36	1.09	.28
B	Juniperus osteosperma	0	3	1.25	.63
B	Mahonia fremontii	0	0	-	-
B	Opuntia spp.	1	0	.00	-
B	Pinus edulis	0	5	1.87	2.24
Total for Browse		141	141	20.32	24.65

CANOPY COVER --
Herd unit 15 , Study no: 1

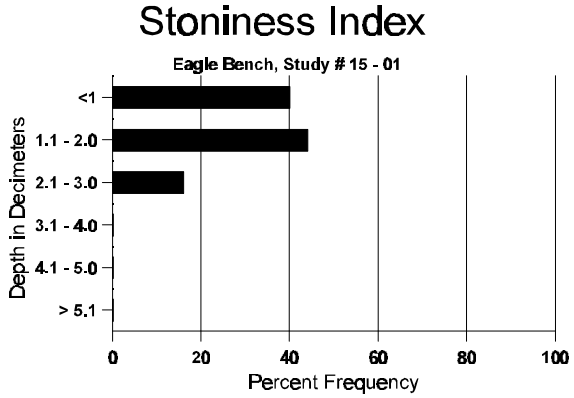
Species	Percent Cover '99
Juniperus osteosperma	1
Pinus edulis	.40

BASIC COVER --
Herd unit 15 , Study no: 1

Cover Type	Nested Frequency '94	Nested Frequency '99	Average Cover % '87	Average Cover % '94	Average Cover % '99
Vegetation	264	257	4.25	23.65	29.71
Rock	324	284	23.25	22.56	23.79
Pavement	292	299	16.25	4.56	13.64
Litter	367	325	37.50	22.97	24.80
Cryptogams	6	10	0	.03	.07
Bare Ground	305	309	18.75	20.02	21.97

SOIL ANALYSIS DATA --
Herd Unit 15, Study # 01, Study Name: Eagle Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
9.4	52.4 (9.7)	6.6	51.3	28.2	20.6	2.4	14.5	96.0	0.6



PELLET GROUP DATA --
Herd unit 15 , Study no: 1

Type	Quadrat Frequency '94	Quadrat Frequency '99	Pellet Transect Days Use/Acre (ha) '99
Rabbit	10	12	N/A
Deer	-	1	1 (2)
Cattle	-	2	9 (22)

BROWSE CHARACTERISTICS --
Herd unit 15 , Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	-	-	-	-	1	-	-	-	-	1	-	-	-	20	46	61	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'87	00%	00%	00%
'94	00%	00%	00%
'99	100%	00%	00%

Total Plants/Acre (excluding Dead & Seedlings)	%Change		
'87	0	Dec:	-
'94	0		-
'99	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	10	-	-	-	-	-	2	-	-	12	-	-	-	240			12
	99	10	-	-	1	-	-	-	-	-	11	-	-	-	220			11
Y	87	6	12	-	-	-	-	-	-	-	18	-	-	-	1200			18
	94	19	-	-	2	-	-	1	-	-	16	2	4	-	440			22
	99	14	5	1	1	-	-	3	-	-	24	-	-	-	480			24
M	87	2	75	4	-	-	-	-	-	-	81	-	-	-	5400	18	27	81
	94	286	-	-	1	-	-	-	-	-	199	81	7	-	5740	17	26	287
	99	143	114	8	-	-	-	-	-	-	258	7	-	-	5300	17	30	265
D	87	-	3	1	-	-	-	-	-	-	4	-	-	-	266			4
	94	11	-	-	-	-	-	-	-	-	7	2	-	2	220			11
	99	16	5	4	1	-	2	-	-	-	21	-	4	3	560			28
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	87%	05%	00%	- 7%
'94	00%	00%	04%	- 1%
'99	39%	05%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	6866	Dec:	4%
	'94	6400		3%
	'99	6340		9%

Ephedra viridis																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	8	0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	10	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	0		-
	'99	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	4	-	-	4	-	-	-	80			4
Y	87	1	1	-	-	-	-	1	-	-	3	-	-	-	200			3
	94	4	2	3	-	-	-	-	-	-	9	-	-	-	180			9
	99	-	-	2	-	-	-	-	-	-	2	-	-	-	40			2
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	3	1
	94	9	-	-	-	-	-	-	-	-	9	-	-	-	180	3	3	9
	99	2	5	-	7	-	-	-	-	-	14	-	-	-	280	3	4	14

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	25%	00%	00%	+26%
'94	11%	17%	00%	-11%
'99	31%	13%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	266	Dec:	-
	'94	360		-
	'99	320		-

Gutierrezia sarothrae																		
S	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	2	-	-	1	-	-	1	-	-	4	-	-	-	80			4
	99	19	-	-	-	-	-	-	-	-	19	-	-	-	380			19
Y	87	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	99	37	-	-	-	-	-	-	-	-	37	-	-	-	740			37
M	87	34	-	-	-	-	-	-	-	-	34	-	-	-	2266	6	4	34
	94	80	-	-	7	-	-	-	-	-	87	-	-	-	1740	5	6	87
	99	66	-	-	-	-	-	-	-	-	66	-	-	-	1320	3	3	66
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-21%
'94	00%	00%	00%	+ 6%
'99	00%	00%	.96%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	2466	Dec:	0%
	'94	1960		3%
	'99	2080		1%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	0		-
	'99	60		-

Mahonia fremontii																		
S	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	0		-
	'99	0		-

Opuntia spp.																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	
'94	00%	00%	00%	
'99	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	20		-
	'99	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	99	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'87	00%	00%	00%
'94	00%	00%	00%
'99	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'94	0		-
	'99	100		-